

REMARKS

Reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks is respectfully requested.

In response to the final Office Action of August 6, 2008, reconsideration and allowance of the subject application in view of the following remarks is respectfully requested.

The courtesies extended to Applicant's representative by Examiner Boateng at the interview held May 20, 2009, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below and constitute Applicant's record of the interview.

Claims 1-3, 6-8 and 10-13 stand rejected under 35 U.S.C. §103(a) over Odahhara (US 2002/0161537) in view of Champlin (US 6,294,896). This rejection is respectfully traversed, the claims, as presented below, are believed to be patentable over the applied art for the failure of the applied art to not only disclose, teach or suggest all of Applicant's recited claim features, but in addition fails to present any apparent reason to combine references or modify prior art to create the Applicant's allegedly obvious claim elements. The arguments presented below constitute the arguments presented during the Personal Interview with Examiner Boateng, and based upon these arguments the Examiner "agreed that all the limitations set forth in the claims were not met by the Odahhara in view of Champlin references."

As disclosed in Applicant's specification at page 5, lines 12+, and Figs. 3 and 4, the direct current (DC) voltage (Vdc) of the storage battery cell and the small AC impedance voltage signal (Vis') generated by the internal resistance of the storage battery cell is not voltage-divided and is directly connected to the input terminals of differential amplifier 1. The output of the differential amplifier is connected both to a DC filter 3 to provide a pure DC voltage to A/D converter 5, as well as being connected to a DC coupling circuit 6 that removes the DC component of the signal and passes only the AC portion of the signal to A/D converter 9 via band pass filter 7. Odahhara on the other hand only appears to disclose circuitry that ignores the AC impedance voltage of the battery cell and only measures the DC current and DC voltage of the battery cell.

Claim 1 is based upon the above disclosure and recites a circuit for measuring post voltage and an internal impedance value of storage battery cells, the circuit comprising *inter alia*:

- a differential amplifier having inputs connected to battery terminals(+,-);
- a reference constant voltage circuit connected to offset terminals of the differential amplifier;
- a direct current coupling circuit connected to an output of the differential amplifier;
- a band pass filter configured to allow only signals having a frequency band near to internal impedance voltage signals to be passed;
- a A/D converter for converting analog signals into digital signals, wherein the analog signals include alternating current signals flowing into the battery cells, internal impedance voltage signals obtained from an output of the direct current coupling circuit, and direct current voltage of the battery cells obtained from the output of the differential amplifier; and
- a central processing unit (CPU) configured to compute internal impedance values by obtaining output signals of the A/D converter.

As recited in claim 1, the claimed circuit includes computes internal impedance values using a current detection circuit separate from the battery charging or discharging circuit. Odahhara, on the other hand appears to only disclose wherein the internal impedance value is measured while charging or discharging the battery, and it is necessary to be equipped with a current measurement circuit for measuring the charging or discharging current.

The Examiner posits that DC/DC converter 55 of Odahhara suggests the recited “reference constant voltage circuit connected to offset terminals of the differential amplifier....” Applicant respectfully disagrees.

As disclosed in paragraph [0061] and depicted in the block diagram of Fig. 6, Odahhara merely discloses wherein “outputs from an AC adapter 51 and the non-intelligent battery 80 are supplied to a DC/DC converter 55.” In other words, the outputs of the AC adapter and the battery are inputs to the DC/DC converter, which is well known in the field of electronics to derive a DC voltage from one or more non-regulated DC sources. Nowhere does Odahhara disclose, teach, or suggest a “reference constant voltage circuit connected to offset terminals of the differential amplifier,” as recited in claim 1.

Furthermore, as presented above, the instant specification discloses, and claim 1 recites “a direct current coupling circuit connected to an output of the differential amplifier...,” for separating the AC component from the battery cell signal, “a band pass filter configured to allow only signals having a frequency band near to internal impedance voltage signals to be passed...,” and “a A/D converter” for converting analog signals that includes “internal impedance voltage signals obtained from an output of the direct current coupling circuit...”

Notwithstanding the Office Action’s assertions to the contrary, paragraph [0033] of Odahhara fails to suggest the recited direct current coupling circuit. Paragraph [0033] appears to only discuss power circuit 50 as depicted in Fig. 1 and which generates DC constant voltages used in the computer system 10, and nowhere teaches a coupling circuit that blocks DC and passes only an AC portion of signal. It is suggested that the Office Action’s indication of paragraph [0033] is a typographical error and perhaps paragraph [0033] should read instead paragraph [0053] that relates to current and voltage measuring devices 73-76.

However, these components are connected to an output of differential amplifier 71 and discharge stop FET 76 and charge stop FET 75 are protection circuits that block both AC and DC and are unrelated to the apparatus or function of the instant circuit.

The Examiner admits that Odahhara fails to disclose the recited band pass filter and relies upon Champlin to remedy the deficiencies of Odahhara. Notwithstanding any disclosure Champlin may make regarding a band pass filter, Applicant respectfully submits that Champlin fails to disclose, teach, or suggest at least the reference constant voltage circuit, or the direct current coupling circuit, as presented above.

Independent claims 7 and 11 is similar to claim 1 and recites wherein an output of the differential amplifier is converted into impedance voltage signals after passing a direct current coupling circuit, and are likewise patentable over Odahhara for the reasons presented above.

Based upon the above disclosure, Applicant respectfully submits that the asserted combination of references fails to disclose all features of independent claims 1, 7, and 11 and presents no apparent reason to combine references or modify prior art to create the Applicant’s allegedly obvious claim elements. Therefore, Applicant respectfully submits that the asserted

combination of references fails to disclose the circuit as recited in claims 1, 7, and 11. Furthermore, claim 2, 3, 6, 8, and 11-13 depend variously from independent claims 1, 7, and 11 and are likewise patentable over the asserted combination of references for at least their dependence on an allowable base claim, as well as for the additional features they recite. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited. Early issuance of a Notice of Allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
LOWE HAUPTMAN HAM & BERNER, LLP

/Yoon S Ham/
Yoon S. Ham
Registration No. 45,307

Customer Number: 22429
1700 Diagonal Road, Suite 300
Alexandria, Virginia 22314
(703) 684-1111
(703) 518-5499 Facsimile
Date: May 22, 2009
YSH/ERM